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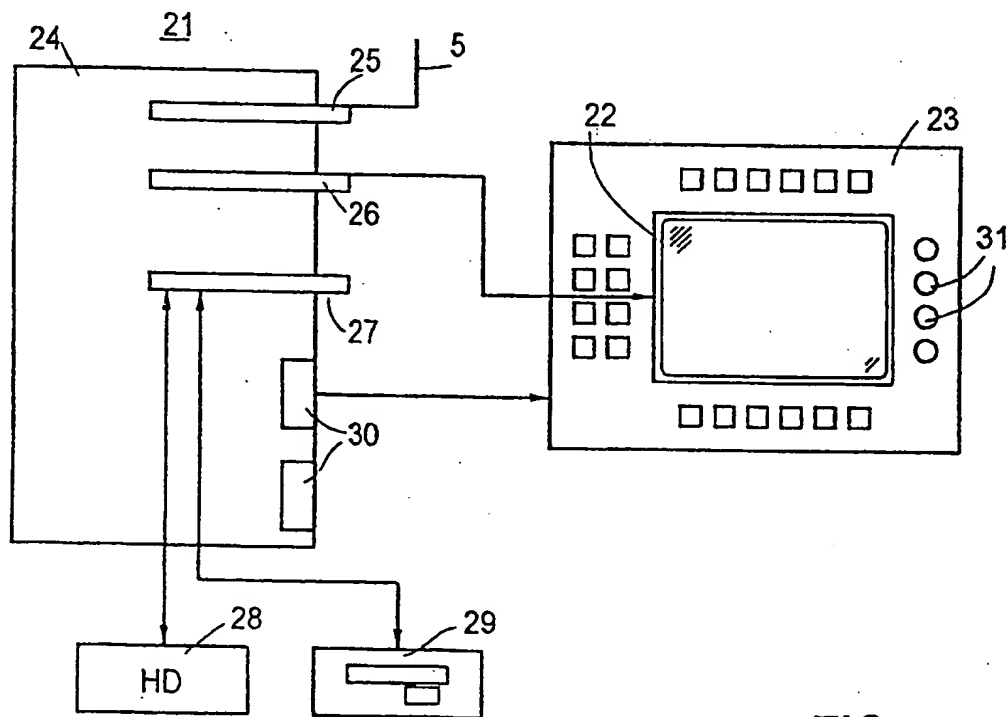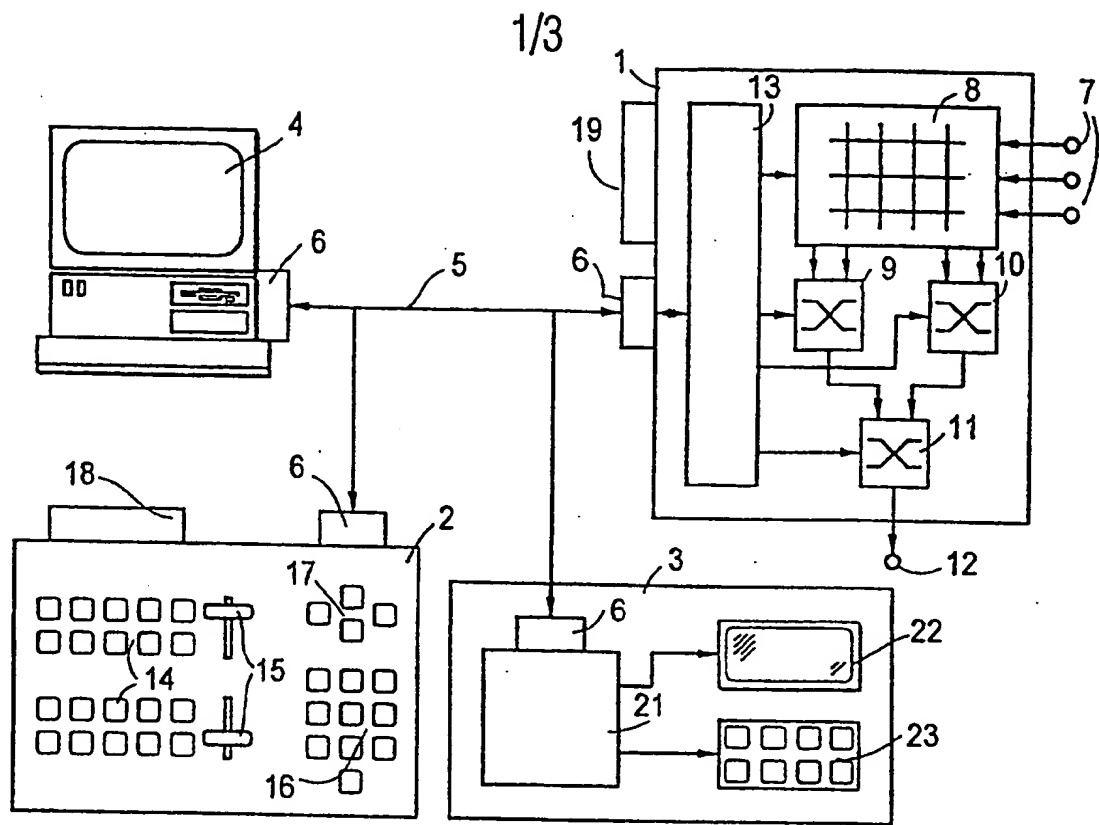9/74 9/75 9/76
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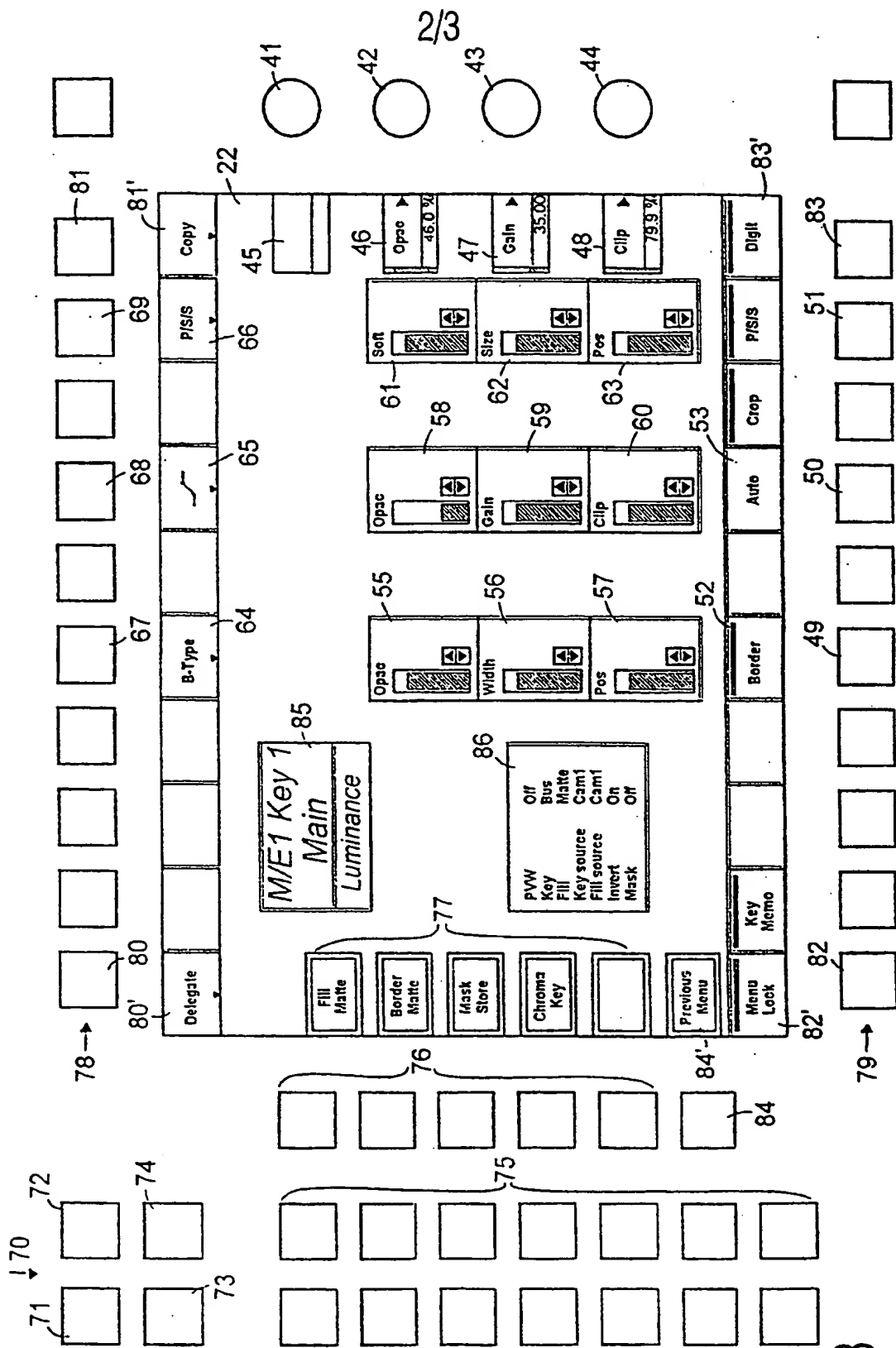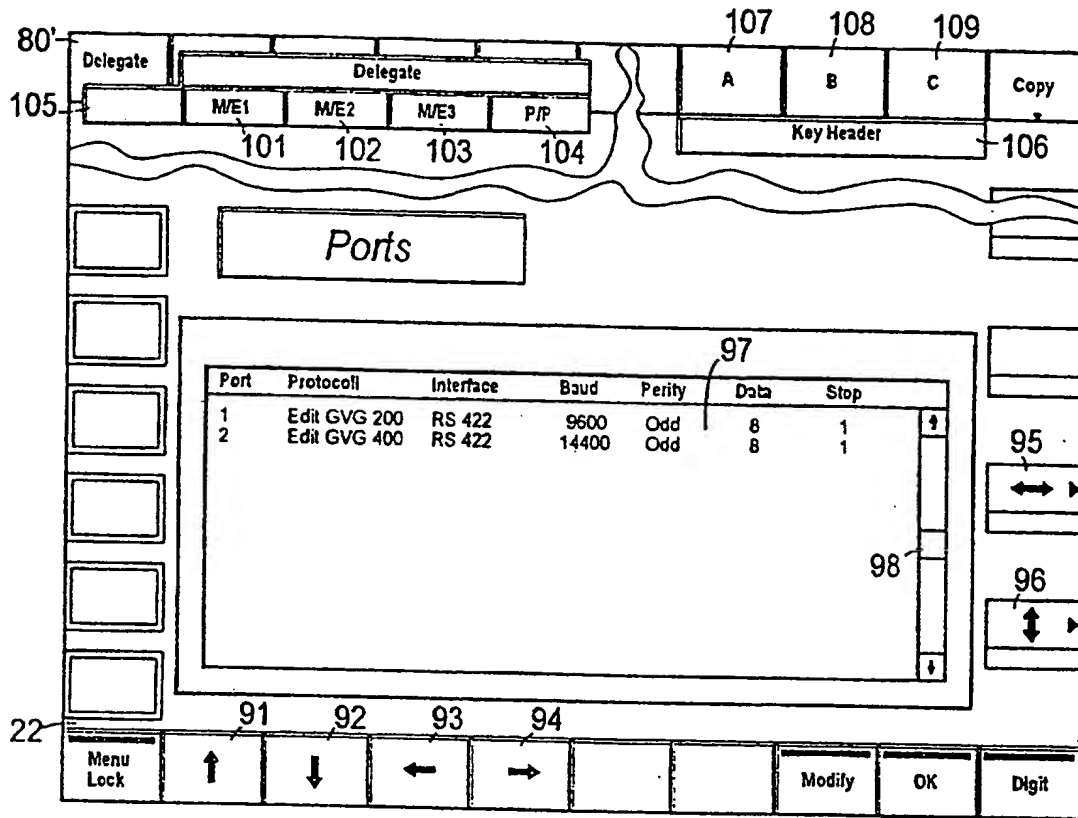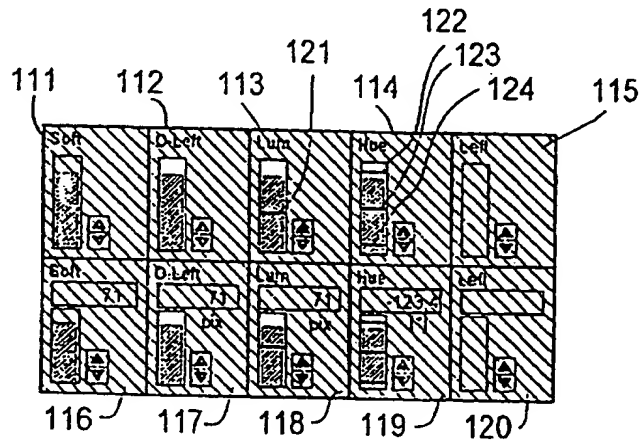Department, Cross Oak Lane, REDHILL, Surrey,
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(54) Abstract Title
Video signal mixing device

(57) In a mixing device comprising a video signal mixer 1 and an operating device 2, transmitting control signals to the mixer in dependence upon the relevant setting of operating elements, the ease of operation is essentially improved by a supplementary operating device 3 having a graphic user interface 22 and by a local network 5 for transmitting data between the mixer 1, the operating device 2 and the supplementary operating device 3.

FIG. 1

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FIG. 1

FIG. 2

2/3

41 42 43 44

Copy 22 45 46 Opac 46.0 % 47 Gain 35.00 48 Clip 79.9 %

81 81' 83' Digit 83

P/S/S 66 51 P/S/S

65 64 B-Type Crop

Soft 61 Size 62 Pos 63

Opac 58 Gain 59 Clip 60 53 Auto 50

Opac 55 Width 56 Pos 57 52 Border 49

M/E1 Key 1
Main
Luminance 85

86
PVW
Key
Fill
Key source
Fill source
Invert
Mask

Off
Bus
Matte
Cam1
Cam1
On
Off

67 68 69

80 Delegate 80'

78→ 79→

77 Fill Matte Border Matte Mask Store Chroma Key Previous Menu

Key Memo Menu Lock 82' 82

76 84' 84

75

70 71 72 73 74

FIG. 3

FIG. 4

FIG. 5

Mixing device comprising a mixer for video signals

The invention relates to a mixing device comprising a mixer for video signals and an operating device, transmitting control signals to the mixer in dependence upon the relevant setting of operating elements.

With the increasing technical facilities for processing video signals, and

5   more demanding requirements in the production of films and television programs, mixing devices for video signals - also referred to as video mixers - have developed to extremely complex units. The number of operating elements has also become much larger so that great skills have to be imposed on the operators.

It is an object of the present invention to provide a video signal mixing

10   device with enhanced facilities for use.

According to the invention, this object is solved by means of a supplementary operating device having a graphic user interface, and by a local network for transmitting data between the mixer, the operating device and the supplementary operating device.

15   The mixing device according to the invention has the advantage that, on the one hand, a conventional operating device is available to the operators, essentially directors and video mixers, with which device the operations required during a production can be performed and, on the other hand, a multitude of settings can be performed for individual productions, recordings and the directing staff's mode of operation by means of

20   the graphic user interface in a convenient way.

Particularly to this end, at least one operating element is assigned to the graphic user interface. A graphic user interface, in which all operations are performed by clicking a mouse, touching the screen or with the aid of other "point and click" indicator devices can also be used within the scope of the invention. However, the additional operating

25   elements allow the user easy access.

In the mixing device according to the invention, the supplementary operating device is implemented to predetermine settings of the operating elements of the operating device. This implementation advantageously facilitates an adaptation of the operating device and hence of the mixer to the relevant tasks to be performed, for which the

settings are stored and can be called forward again when the same or a similar task is to be performed.

Another advantageous embodiment is characterized in that the supplementary operating device is implemented to assign predetermined functions to
5   operating elements of the operating device. This also provides the possibility of adaptations to the relevant tasks of the mixing device and to the directing staff's mode of operation.

In this embodiment, a decimal keyboard of the operating device for entering numerical values may be assigned to the supplementary operating device. This essentially supports the operations carried out with the aid of the supplementary operating
10   device. The operating device itself is generally implemented as a relatively flat panel, whereas operating elements which are not required so frequently, particularly not during productions, such as indicator elements are arranged on a steeper, separable part of the panel further remote from the user. The user interface and the operating elements for the supplementary operating device are preferably also built in this part. Since a decimal
15   keyboard for numerical value entries is arranged within easy reach of the user of the conventional operating devices, the implementation described hereinbefore can essentially simplify the operation of entering numerical values.

Since the user interface within each menu allows entry of a plurality of values, this embodiment may be further characterized in that keys indicating a direction and
20   juxtaposed to the keyboard are assignable to the supplementary operating device in such a way that they act as cursor keys on the graphic user interface and allow selection of an assignment of the numerical values entered by way of the decimal keyboard to values indicated on the graphic user interface.

A further embodiment of the mixing device according to the invention is
25   characterized in that a designation, assigned to the operating elements of the operating device, indicating predetermined settings and/or assignments to given functions, is automatically adaptable by controlling the supplementary operating device. This also provides the possibility of adapting the operating device to different tasks, while the relevant designation and the assignment of given functions can be stored in a memory.

30   The mixing device according to the invention can be realized in a very simple way in that the supplementary operating device essentially comprises a personal computer, a picture display device and at least one input device. This has the advantage that many components available for personal computers, such as, for example network cards, mass stores and graphic cards can be used for the supplementary operating device.

Moreover, a multitude of programming tools is available, which can be used advantageously in the manufacture of the supplementary operating device and the data links with the mixer and the operating device. The personal computer may comprise at least a graphic card, a network card, a hard disk drive and at least two communication interfaces.

5   In this embodiment, it is particularly advantageous when the input device comprises operating elements arranged around the display screen of the picture display device.

                However, in addition or alternatively to other input devices, it is very well possible to use a mouse, a track ball, a keyboard or other input devices (for example,

10   tablets) for personal computers.

                A further embodiment of the mixing device according to the invention is characterized in that, when activating operating elements of the operating device, a menu assigned to the relevant operating element is called forward on the graphic user interface. This has the advantage that the user working with the operating device can view the

15   indications associated with each activation and may perform changes with the aid of the supplementary operating device.

                Mixing devices are invariably used for different purposes and by different users. In order that the settings for a given task and for given users need not be reprocessed in a cumbersome way, the settings can be stored permanently. Then, it may also be taken

20   into account that frequently not all apparatuses (resources) of a mixing device are needed for each task. A further embodiment is therefore characterized in that assignments of individual apparatuses of the mixer to predeterminable tasks and to users of the mixing device can be stored in the supplementary operating device and processed by means of the graphic user interface.

25   These and other aspects of the invention are apparent from and will be elucidated with reference to the embodiments described hereinafter.

                In the drawings:

30   Fig. 1 is a block diagram of a mixing device according to the invention,

                Fig. 2 shows diagrammatically the supplementary operating device,

                Fig. 3 is an example of a graphic user interface with a menu and additional operating elements of the supplementary operating device,

                Fig. 4 shows sections of a plurality of other menus and

Fig. 5 shows different indication and input fields for analog values.

Identical components in the Figures have the same reference numerals. In Figs. 3 to 5, the graphic implementation with different colors, shades and 3D effects provided for the invention is replaced by a simplified representation with black lines and
5   shaded areas as imposed by patent drawing requirements.

In the mixing device shown in Fig. 1, a video mixer 1, an operating device 2, a supplementary operating device 3 and a personal computer 4 are interconnected via a local network 5, preferably a Cheaper net. The personal computer 4 is optional and does not need any further description to explain the invention. Each of the connected
10   apparatuses has an interface in the form of a network card 6.

The mixer 1 is also known per se. However, for the sake of clarity, for example inputs 7 for video signals, a crossbar 8 and fader circuits 9, 10, 11 and an output 12 are shown. The crossbar 8 and the fader circuits 9 to 11 are controlled by an arithmetic unit 13 which converts commands received via the local network into setting signals for the
15   crossbar 8 and the fader circuits 9 to 11 and supplies status information from the mixing device to the other components via the local network 5.

The operating device 2, which is also of a known type, comprises keys 14 for selecting the video signals to be mixed, fader controls 15 and a series of other operating elements which are not shown in Fig. 1. Such operating elements are used, for example for
20   selecting trick figures (key patterns) or for adjusting chrominance signal values for the chroma key or color area-generating signals (matte signals). These are signals which represent an essentially single-color or two-color area with continuous or trick pattern-controlled color transitions and, if required, may be used as background signals or for filling up other areas in the picture. For entering numerical values, the operating device 2 is further
25   provided with a decimal keyboard 16. Video recorders, laser discs, disc recorders or video-effect apparatuses may also be operated, particularly positioned and switched to the recording or reproducing mode by the mixing device. To this end, the operating device 2 is provided with a plurality of keys 17.

Both the operating device 2 and the mixer 1 have a plurality of ports 18,
30   19 via which further devices can be connected and controlled such as, for example, crossbars, video recorders and video-effect devices.

The supplementary operating device 3 essentially comprises a personal computer 21 to which a picture display device 22 and an input device 23 are connected. The display screen of the display device may be constituted, for example by a liquid crystal

display in the TFT technique. The input device 23 may be a keyboard, particularly a keyboard adapted to the display, as shown in Figs. 2 and 3. However, a mouse or a track ball may be used instead or as additional devices.

5   Fig. 2 shows diagrammatically the supplementary operating device 3 with the personal computer 21, the display screen 22 and the input device 23 arranged around the display screen 22. The personal computer 21 comprises, inter alia the mother board 24, a network card 25, a graphics card 26 from which digital VGA signals are transmitted to the display screen 22, a disc controller 27 which controls a hard disk 28 and a disc drive mechanism 29, as well as two R232 interfaces 30.

10   The display screen 22 is implemented by means of suitable programs as a graphic user interface, in which the operating elements 31 of the input device 23 are in context with the relevant contents of the display screen 22.

Dependent on the operation to be performed, different menus can be visualized on the display screen 22, with switching areas, hereinafter referred to as buttons,

15   being arranged at the upper, the lower and the left-hand border of the display screen which, as regards function, correspond to the juxtaposed keys.

Digipots 41 to 44 are arranged at the right-hand border of the display screen 22 (Fig. 3). To set several values, fields 45 to 48 are used which are arranged on the inner side of the right-hand border of the display screen 22, i.e. near the digipots. These

20   fields indicate the names and the values set in the form of diagram columns or as numerical values. In the menu shown, only three of these inputs are possible. An empty field 45 indicates that an input is principally possible by the digipot 41, but not relevant at this menu.

In the selection of the menu :"M/E1 KEY1 main luminance" shown in

25   Fig. 3, three different values may be assigned to the digipots 42, 43, 44. This assignment can be realized by means of keys 49, 50, 51, 67, 68, 69 or mouse clicks on the buttons 52, 53, 54. Three fields 55, 56, 57; 58, 59, 60; 61, 62, 63 are visible in the relevant column and indicate the value settings as bar diagrams. Small buttons provided with arrows next to the bar diagrams are used for changing the value settings by means of mouse clicks.

30   Moreover, the value settings can be changed by dragging the mouse at the upper edge of the bar.

Whereas the fields 55 to 57 are used for indication and adjustment of the transparency, the width and the position of a border, the fields 58 to 60 are used for adjusting the transparency, the gain and the clipping threshold. The button 53 and the key 50

are used for starting automatic setting of the clipping threshold. The fields 61 to 63 are used for setting the value of a smooth transition and the position of the key signal. The same column is provided with buttons 64, 65, 66 at the upper edge of the display screen, with corresponding keys 67, 68, 69 above the display screen which partly also relate to the

5   functions of "border", clip-gain versus clean-up/density mode selection and "P/S/S". When one of the keys 67 to 69 is activated, or when one of the buttons 64 to 66 marked by means of an arrow head is clicked, a selection menu appears on the display screen, from which menu a desired setting can be performed, for example, the type of border, either by clicking the corresponding areas of the selection menu or activating the keys above it.

10   Different menus which are used for processing a command or for adjusting an apparatus in the mixer can be called by means of keys combined in a block 70. For example, a start menu is called by means of a key 71, an installation menu by means of the key 72, an application menu by means of the key 73 and a menu for personal data, for example user names and passwords, by means of the key 74. The keys 75 are used for

15   calling menus for different mixer components, for example keying units, fader circuits or trick generators.

Keys 76 arranged at the left-hand edge of the display screen as well as neighboring buttons 77 arranged on the display screen are dependent on the menu, likewise as the keys of the upper row 78 and the lower row 79. In most cases, the keys 80 and 81 in

20   the upper row, the keys 82 and 83 in the lower row and the keys 84 in the left-hand row are exempt from this dependence, i.e. a menu-dependent function. Generally independent of the menu called and similarly as the associated buttons 80' to 84', these keys have the following designations: the key 80 above the button 80', denoted by "delegate", is used for delegating the respective menu to one out of a plurality of similar resources (devices), for example

25   chroma key devices. When the key 80 is activated, a sub-menu shown in Fig. 4 will become visible, with which one of the devices can be selected by activating the superposed keys or by clicking the relevant button of the sub-menu.

The key 81 and the button 81' are used for copying or exchanging settings to or from other menus.

30   An automatic exchange of the menu by operating the operating device can be blocked by means of the key 82 and the button 82'.

The key 83 and the button 83' are used to insert the value settings numerically in the fields 55 to 63. This setting, likewise as other settings, can be stored in the "personality" menu for the operating person concerned. A further function of the key 83

and the button 83' is to delegate inputs to the decimal keyboard 16 (Fig. 1) by means of a double click. The keys 17 can be used like cursor keys, i.e. in the menu shown by way of example in Fig. 3, fields 55 to 63 can be selected and subsequently the value then becoming visible can be changed by means of the decimal keyboard. The key 84 and the button 84'
5 provide the possibility of a return to the previously called menu.

The buttons are graphically implemented in such a way that their type and possibly the switching state can easily be recognized. For example, a button with a border such as the button 84' is a dialog button. A button without a border such as, for example the button 53 triggers an action. Buttons with a line at the upper edge in the lower row or at the
10 lower edge in the upper row have an on/off switching function, with a change of color of the line indicating the switching state. Buttons which can be used in the respective menu appear in black script, whereas irrelevant buttons do not appear in script or with a deviating color, for example grey. Buttons with a triangle pointing at the edge indicate that a sub-menu is superimposed upon activation (overlay).
15 Each menu is clearly characterized by a name in a special field 85. A further field 86 may be used for different indications and inputs, while further fields may appear when clicking single text rows of the field 86.

Fig. 4 shows sections of a further menu. For example, a "ports" menu indicates that the digipots 43, 44 and the keys in the lower row (Fig. 3) can be used for
20 moving a cursor so as to realize corresponding settings in a list of the ports 18, 19 (Fig. 1). To indicate the function of the digipots and keys, the keys and fields 91 to 96 are provided with corresponding arrow symbols. Apart from the use of operating elements arranged outside the display screen 22, the cursor may also be moved by clicking the corresponding fields 91 to 96 or by clicking the position on the window 97 provided for the cursor. It is
25 possible to browse in long lists by means of a scroll bar 98.

A section from another menu also shown in Fig. 4 shows the appearance of a sub-menu when the "delegate" key 80 (Fig. 3) or the button 80' is activated. This sub-menu is superimposed on the neighboring buttons so that allocation to the superposed keys can be recognized. A selection from the sub-menu is thus simply possible by using the
30 superposed keys or by clicking one of the buttons 101 to 104. The sub-menu can be closed by clicking the button 105.

A further particular detail shown in Fig. 4 is that a key heading in a field 106 indicates to the user that these keys and also the associated buttons 107, 108 and 109 provide the possibility of a 1-out-of-n selection.

When indicating and inputting parameters with a continuous range of values, also referred to as analog values, a convenient display is very important. This applies both to the value set and to further information required in relation to the value. This is realized in the embodiment shown in Fig. 5 by differently colored divisions of the bar
5 diagram, by markings in the bar diagram as well as by additional display of numerical values. In view of the requirements for filing patent applications, the colors are shown as shaded areas and a grey script in a practical embodiment is shown thinner as the other script.

In the field 101, a relevant setting, which is not delegated to a given device, is clarified in that the background of the bar diagram has the same color as the field
10 111 itself. The bar itself is black. However, in the field 111, the background of the bar diagram has a deviating color (white) so as to show that this value is delegated. The bar itself is then, for example blue. This is also the case for the value in field 113 in which an additional marking 121 is provided. The field 114 shows the chromaticity value (hue) setting which is preferably shown as a bar diagram in the embodiment, although there is an angle
15 between 0° and 360°. Here, there are three markings 122, 123, 124 which represent predetermined colors. The field 115 is not relevant in the presupposed menu and is therefore shown without a bar and in a single color.

The fields 116 to 120 indicate the same values as the fields 111 to 115, with an additional numerical indication for each value.

20 From reading the present disclosure, other modifications and variations will be apparent to persons skilled in the art. Such modifications and variations may involve equivalent features and other features which are already known in the art and which may be used instead of or in addition to features already disclosed herein. Although claims have been formulated in this Application to particular combinations of features, it should be understood
25 that the scope of the disclosure of the present application includes any and every novel feature or any novel combination of features disclosed herein either explicitly or implicitly and any generalisation thereof, whether or not it relates to the same invention as presently claimed in any Claim and whether or not it mitigates any or all of the same technical problems as does the present invention. The Applicants hereby give notice that new claims may be formulated
30 to such features and/or combinations of such features during prosecution of the present application or of any further application derived therefrom.

It has been stated above that the drawings illustrate examples of embodiments of the invention and, in order to avoid any misunderstanding, it is hereby further stated that, in the following claims, where technical features mentioned in any claim are followed by reference
35 signs relating to features in the drawings and placed between parentheses, these reference signs

have been included for the sole purpose of facilitating comprehension of the claim, by reference to an example.

CLAIMS:

1.   A mixing device comprising a video signal mixer and an operating device, transmitting control signals to the mixer in dependence upon the relevant setting of operating elements, characterized by a supplementary operating device (3) having a graphic user interface (22), and a local network (5) for transmitting data between the mixer (1), the
5   operating device (2) and the supplementary operating device (3).

2.   A mixing device as claimed in claim 1, characterized in that at least one operating element (31) is assigned to the graphic user interface (22).

3.   A mixing device as claimed in claim 1 or 2, characterized in that the supplementary operating device (3) is implemented to predetermine settings of the operating
10 elements of the operating device (2).

4.   A mixing device as claimed in any one of the preceding claims, characterized in that the supplementary operating device (3) is implemented to assign predetermined functions to operating elements (14, 15) of the operating device (2).

5.   A mixing device as claimed in claim 4, characterized in that a decimal
15 keyboard (16) of the operating device (2) is assigned to the supplementary operating device (3) for entering numerical values.

6.   A mixing device as claimed in claim 5, characterized in that keys (17) indicating a direction and juxtaposed to the decimal keyboard are assignable to the supplementary operating device (3) in such a way that they act as cursor keys on the graphic
20 user interface (22) and allow selection of an assignment of the numerical values entered by way of the decimal keyboard (16) to values indicated on the graphic user interface (22).

7.   A mixing device as claimed in any one of claims 3 to 6, characterized in that a designation, assigned to the operating elements (14 to 17) of the operating device (2), indicating predetermined settings and/or assignments to given functions is automatically
25 adaptable by controlling the supplementary operating device (3).

8.   A mixing device as claimed in any one of the preceding claims, characterized in that the supplementary operating device (3) essentially comprises a personal computer (21), a picture display device and at least one input device (23).

9.   A mixing device as claimed in claim 8, characterized in that the personal

computer (21) comprises at least a graphic card (26), a network card (25), a hard disk drive (28) and at least two communication interfaces (30).

10.   A mixing device as claimed in claim 8 or 9, characterized in that the input device (23) comprises operating elements arranged around the display screen (22) of the picture display device.

11.   A mixing device as claimed in any one of the preceding claims, characterized in that, when activating operating elements (14 to 17) of the operating device, a menu assigned to the relevant operating element is called forward on the graphic user interface (22).

12.   A mixing device as claimed in any one of the preceding claims, characterized in that assignments of individual apparatuses (8, 9, 10, 11) of the mixer (1) to predeterminable tasks and to users of the mixing device can be stored in the supplementary operating device (3) and processed by means of the graphic user interface (22).

13.   Equipment comprising a mixing device as claimed in anyone of the preceding claims.

14.   Any novel combination of features included in the description or in the drawings or in the preceding claims.

Application No:	GB 9806344.9	Examiner:	John Donaldson
Claims searched:	1 to 13	Date of search:	27 July 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

   UK Cl (Ed.P): H4F(FAAN, FGG, FGH, FGJ, FGS, FGT)

   Int Cl (Ed.6): H04N 5/00, 5/222, 5/262, 5/265, 5/272, 9/00, 9/64, 9/74, 9/75, 9/76

Other: Online:WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 0518500 A2 (SONY), see column 5, line 21 to column 7, line 41	1 to 4, 8, 9, 12, 13

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.